

WHAT IS CLAIMED IS:

1. A variable capacitor element comprising:
 - a buried electrode layer formed in a surface region of a semiconductor
 - 5 substrate with a semiconductor layer of a conductivity type different from the semiconductor substrate;
 - a wiring layer that is formed above the buried electrode layer and is connected to a lead portion of the buried electrode layer;
 - a pair of capacitive insulating films that are formed as regions having
 - 10 mutually opposing adjacent sides in a plane shape on a portion of the buried electrode layer excluding the lead portion;
 - an insulator layer formed on the border region of each outside of the pair of capacitive insulating films in a direction perpendicular to the adjacent sides;
 - a pair of conductor layers formed both on the respective capacitive
 - 15 insulating films and on the respective insulator layers; and
 - wiring layers that are connected respectively to lead portions of the pair of conductor layers above the insulator layer,
 - wherein a capacitance value between the buried electrode layer and each of the pair of conductor layers can be changed by changing a voltage between the
 - 20 buried electrode layer and each of the pair of conductor layers.
2. The variable capacitor element according to claim 1, wherein each of the pair of capacitive insulating films has a quadrangular plane shape.
- 25 3. An integrated circuit having a variable capacitor element, comprising:
 - a resonance circuit composed with a variable capacitor element having the structure according to claim 1, so as to operate as an oscillation circuit,
 - wherein a capacitance value between the buried electrode layer and the pair of conductor layers can be changed by changing a voltage applied to the
 - 30 buried electrode layer of the variable capacitor element.
4. An integrated circuit having a variable capacitor element, comprising:
 - a resonance circuit including at least two variable capacitor elements having the structure according to claim 1 that are connected in parallel, so as to
 - 35 operate as an oscillation circuit; and
 - means for applying, to the buried electrode layer of each of the variable capacitor elements, different voltages obtained with a level converting circuit,

wherein a capacitance value between the buried electrode layer and the pair of conductor layers can be changed.

5. The integrated circuit having a variable capacitor element according to
5 claim 3 or 4, further comprising:
at least one variable capacitor element for frequency range switching
having the structure according to claim 1 that is connected in parallel with the
resonance circuit; and
means for switching a voltage applied to the buried electrode layer of the
10 variable capacitor element for frequency range switching over a plurality of steps,
wherein a capacitance value between the buried electrode layer and the
pair of conductor layers can be changed over a plurality of steps.
6. The integrated circuit having a variable capacitor element according to
15 claim 5,
wherein the means for switching a voltage applied to the buried electrode
layer of the variable capacitor element for frequency range switching is configured
so as to switch the voltage in two steps.